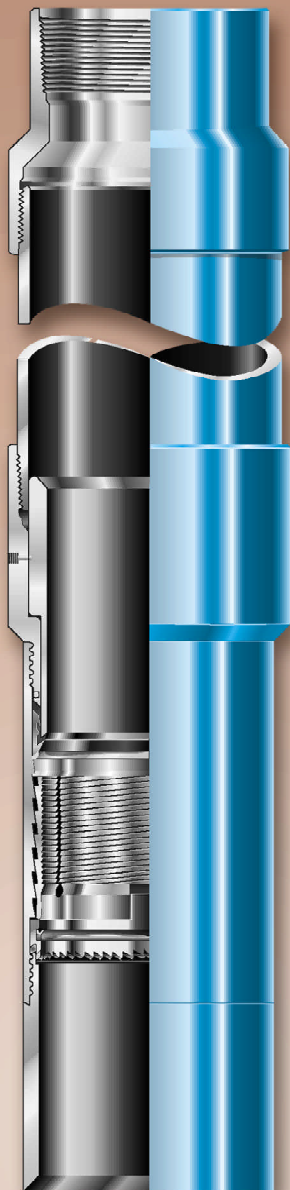


UNDERWATER WELLHEAD CASING PATCH

Instruction Manual 6480



Underwater Wellhead Casing Patch



NATIONAL OILWELL VARCO

One Company Unlimited Solutions

Underwater Wellhead Casing Patch

INDEX

Underwater Wellhead Casing Patch	
General Description	3
Uses	3
Construction	3
Explanation of Mechanism	3
Operation	4
To Engage the Fish	4
To Release from the Fish	4 – 5
Maintenance	5
Disassembly	5
Reassembly	5
Specifications and Replacement Parts	6 – 7

The designs and specifications for the tools described in this instruction manual were in effect at the time this manual was approved for printing. National Oilwell Varco, whose policy is one of continuous improvement, reserves the right to discontinue models at any time, or to change designs and specifications without notice or without incurring obligation.

Seventh Printing, September 2005

General Description

Bowen Casing Patches for Underwater Wellhead Service are engineered to allow casing to be salvaged during landing operations, which would otherwise necessitate expensive underwater washover and pulling operations.

Bowen Casing Patches for Underwater Wellhead Service are essentially the same as the well known standard Bowen Packer Type Casing Patch, with the added feature of a long Top extension. This Extension allows sufficient length to catch the casing by pulling additional length into the Casing Patch.

These Casing Patches are available in a complete range of sizes from 5-1/2" thru 13-3/8" casing. Additional sizes to meet specific requirements will be made on special order.

The Top Extension is manufactured from casing where practical to reduce cost to a minimum. Where this is not practical, alloy tubing is used. Extensions are available, in most cases, of any required length.

Operation of these Casing Patches is identical to operation of the standard Bowen Packer Type Casing Patch.

Use

Bowen Underwater Casing Patches may be used to patch any string of casing, but are specifically intended for use in casing landing operations on offshore installations, in sub-surface wellheads.

Construction

Bowen Underwater Casing Patches are composed of a Bowl, Grapple, Packer (Upper), Control Packer (lower), Packer Protector, Adaptor Sub, Extension Sub, Top Sub, and Guide.

Explanation of Mechanism

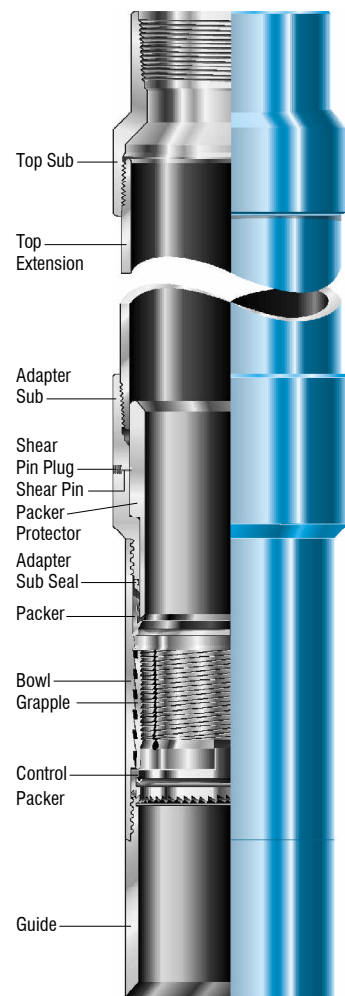
The Casing which is to be engaged during a casing landing operation is referred to as The Fish. The Bowl contains and supports the load-bearing Grapple. The Grapple is free to open sufficiently to admit the Fish and securely engage it by means of the hardened wickers in its inside diameter.

The Bowl contains and supports the load-bearing Grapple. The Grapple is free to open sufficiently to admit the fish (casing), and securely engage it by means of the hardened wickers in its inside diameter. The spirals between the Bowl and the Grapple o.d. will cause the Grapple to engage the Fish tighter over a large area as tensile load is applied and increased on the Bowl.

The Control Packer has hardened milling teeth which will remove burrs from the Fish and pack it off when in place around the Fish. After the Fish is engaged and passes into the Extension, the (upper) Packer will provide a second lip type seal around the Fish.

Top extensions are available in either casing or alloy material. Casing is more economical as far as cost, but usually requires larger o.d.'s. Alloy extensions provide greater strength with their flush o.d.'s.

The Packer Protector prevents the upper lip of the Packer from being damaged when the Fish enters the Packer. The Fish will bear against the Packer Protector, causing it to slide upward as the Fish enters. A suitable Shear Pin maintains the Packer Protector in place until it is displaced by the Fish.



Underwater Wellhead Casing Patch
with Casing Type Extension

Operation

Sometimes, during landing operations, the Casing being landed gets stuck off bottom. If this happens while the casing is being floated down in cement, an expensive and time consuming fishing job could result.

In place of conventional fishing, the operation may be salvaged by using a Bowen Casing Patch in the following manner:

The first collar below the wellhead may be located and the casing cut with a Bowen Hydraulic Internal Cutter, immediately below this collar. The upper portion of the casing is removed from the well. The remaining portion of the casing is picked up with the Bowen Casing Patch, pulled up into the wellhead, and locked in position.

After the cement cures, additional tension may be applied to the cemented string by catching it with a Bowen Releasing Spear, and pulling the upper end of the cemented string several feet into the Extension of the Casing Patch, provided for the purpose.

Prior to operation, check the Casing Patch to assure that it is complete and properly assembled.

Assemble a length of casing between the casing hanger and the Top Sub. The length required must be determined by the operator such that when the Casing Patch is engaged, the casing hanger will be seated in the casing head.

CAUTION: Use tongs on Top Sub only. If undue pressure is exerted on the Bowl, crushing or distortion may result.

To Engage the Fish

Lower the tool into the hole until the fish depth is reached. As the fish is reached, the running string should be slowly rotated to the right while lowering it slowly. This combined slow rotation and lowering is important to the operation of the tool.

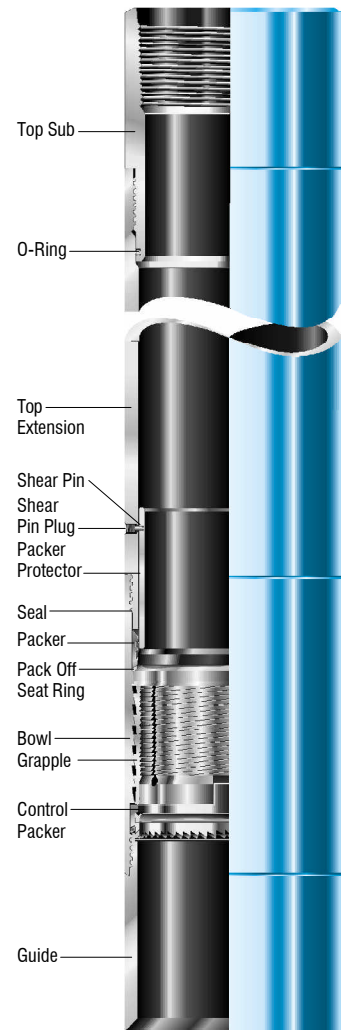
This should be continued until the fish enters the Casing Patch far enough to displace the Packer Protector and enter the Packer area. Simultaneously, the casing hanger should seat in the wellhead.

Proper engagement may be proved by picking up on the hanger, and pressure tested by the application of pump pressure. Allow any torque to slack from the running string, but avoid any backlash.

CAUTION: Care should be exercised during application of pressure to increase the pressure gradually, allowing the Packer to seat smoothly. In no case should the Casing Patch be "slugged" or shock loaded unnecessarily by the mud pumps.

Once the fish enters the Casing Patch and dislodges the Packer Protector, and the tool is subsequently disengaged from the fish, no attempt should be made to re-engage the tool without first bringing it to the surface to reset the Packer Protector. If the Packer Protector is not in position, there is danger of rupturing the upper lip of the Packer, rendering it useless.

NOTE: The Casing Patch may be released with ease any time prior to cementing. Once it is cemented in place however, the internal parts may no longer function and the Patch fail to release. In such cases, its removal may require milling it away or cutting the casing string below the Patch, whichever is simpler.



Underwater Wellhead Casing Patch with Alloy Type Extension

If for any reason it is desired to release the Casing Patch from the casing string, proceed as follows:

To Release from the Fish

Bump down firmly to break the “freeze” between the Grapple and the fish. After bumping down, slowly elevate the running string while simultaneously rotating slowly to the right. Continue this slow rotation and elevation until the Casing Patch is clear of the fish. The combined slow rotation and elevation is important to the proper release of the Casing Patch.

Maintenance

Since the Underwater Casing Patch is not ordinarily reused, usual maintenance does not apply. Preservative methods should be employed however, especially if the patch is to be stored for some period of time before its use. Before storage the tool should be disassembled, cleaned, greased and reassembled ready for service.

Disassembly

1. Break out and remove the top sub from the top extension.
2. Remove the Shear Pin Plug and Shear Pin from the Adaptor Sub.
3. Clamp the tool in a pipe vise and loosen the Adaptor Sub and Guide. Clamp on the Adaptor Sub rather than the Bowl, to avoid any crushing or distortion to the Bowl.
4. Remove the Packer Protector from the Adaptor Sub.
5. Loosen and remove the Adaptor Sub from the Bowl.
6. Remove the Packer near the upper end of the Bowl.
7. Loosen and remove the Guide from the Bowl.
8. Remove the Control Packer.

9. Using right-hand rotation, unscrew the Grapple from the lower end of the Bowl.

Reassembly

1. Screw the Grapple into the lower end of the Bowl, using left-hand rotation. The slot in the Grapple should land in line with the slot in the Bowl.
2. Insert the Control Packer. Fit the finger of the Control Packer into the slots of the Bowl and the Grapple. This keys the Bowl and the Grapple together.
3. Screw the Guide into the lower end of the Bowl.
4. Fold the Packer in and insert it in the space provided near the upper end of the Bowl.
5. Screw the Adaptor Sub into the top of the Bowl.
6. Insert the Packer Protector into the Adaptor Sub, stinger end first.
7. Clamp the tool in a pipe vise and tighten the Adaptor Sub and Guide. Clamp on the Sub rather than the Bowl, to avoid any crushing or distortion to the Bowl.
8. Insert the Shear Pin through the Adaptor Sub and follow it with the Shear Pin Plug.
9. Assemble the Extension and Top Sub and buck them up tight.
10. If required for spacing, insert a short length of casing into the upper connection of the Top Sub and connect the assembly to the casing hanger.

All parts should be thoroughly greased before being assembled. If the tool is to be stored for some time before being used, the outside should be painted or greased to prevent rust or deterioration.

Bowen Underwater Wellhead Casing Patches

Casing Size (Inches)	5-1/2	5-1/2	7	7	9-5/8	9-5/8
Casing Patch O.D. (Inches)	7-21/32	6-13/16	8-5/16	8-5/16	11-1/8	11-1/8
Extension O.D. (Inches)	7	6	8-3/8	8-3/8	11-1/8	11-3/4
Type Of Extension	Casing	Alloy	Casing	Alloy	Alloy	Casing
Length Of Extension	10'	10'	10'	10'	10'	10'
Complete Assembly	Part No.	47778	47772	44960	47767	47972*
	Weight	500	455	400	730	1290
Complete Assembly	Part No.	45000				
	Weight	645				

Replacement Parts

Top Sub	Part No.	47779	47773	44961	44961	46509	45001
	Weight	40	40	62	62	145	100
Top Sub Seal	Part No.	—	30-45	30-42	30-42	30-52	568-275
	Weight	—	1/32	1/32	1/32	1/32	1/32
Top Extension	Part No.	47780	47774	44962	47769	46508	45002
	Weight	347	290	130	500	1000	250
Adapter Sub	Part No.	47781	—	44966	—	—	45005
	Weight	50	—	55	—	—	40
Adapter Sub Seal	Part No.	30-35	—	30-42	—	—	30-52
	Weight	1/32	—	1/32	—	—	1/32
Packer	Part No.	11226	11226	11241	11241	11256*	11256
	Weight	1/4	1/4	1/4	1/4	1/4	1/4
Packer Protector	Part No.	47782	47776	44964	47770	47973	45004
	Weight	30	35	37	45	44	52
Shear Pin (4 Req'd.)	Part No.	47783	46088	46088	46088	47975	46097
	Weight	1/16	1/16	1/16	1/16	1/8	1/8
Shear Pin Plug (4 Req'd.)	Part No.	10641	36478	36478	36478	10641	36478
	Weight	1/16	1/16	1/16	1/16	1/8	1/8
Control Packer	Part No.	11463	11463	11469	11469	11475	11475
	Weight	3	3	4	4	8	8
Grapple	Part No.	11228	11228	11243	11243	11258	11258
	Weight	12	12	15	15	20	20
Bowl	Part No.	47775	47775	44963	44963	47974	45003
	Weight	40	40	47	47	75	79
Guide	Part No.	11229	11229	11244	11244	11259	11259
	Weight	40	40	50	50	90	90
Top Extension Seal	Part No.	—	30-35	—	30-42	30-52	568-275
	Weight	—	1/16	—	1/16	1/16	1/16

* Special 2 Packers Required for these Assemblies.

How To Order:

Specify: (1) Name and number of assembly or part.
 (2) Connection size and type.
 (3) Type of casing patch.
 (4) Casing size to be patched.
 (5) Length and o.d. of extension if other than standard.

Bowen Underwater Wellhead Casing Patches (Continued)

Casing Size (Inches)		9-5/8	10-3/4	10-3/4	13-3/8	13-3/8	13-3/8
Casing Patch O.D. (Inches)		11-1/8	14-3/8	12-5/16	17	15-1/8	17
Extension O.D. (Inches)		11-1/8	13-3/8	12-3/8	16	15-1/8	16
Type Of Extension		Alloy	Casing	Alloy	Casing	Alloy	Casing
Length Of Extension		10'	10'	10'	10'	10'	10'
Complete Assembly	Part No.	47758	47736	47730	43379	40398	47966*
	Weight	1145	1625	1325	1300	1980	1400

Replacement Parts

Top Sub	Part No.	47759	47737	47731	43378	40399	43378
	Weight	130	160	120	230	175	230
Top Sub Seal	Part No.	30-52	—	568-276	—	27-83	—
	Weight	1/32	—	1/16	—	1/16	—
Top Extension	Part No.	47760	47738	47732	43377	48311	43377
	Weight	770	1060	920	390	1440	390
Adapter Sub	Part No.	—	47739	—	43380	—	43380
	Weight	—	115	—	210	—	210
Adapter Sub Seal	Part No.	—	568-276	—	27-83	—	27-83
	Weight	—	1/16	—	1/16	—	1/16
Packer	Part No.	11256	11261	11261	41061	41061	41061*
	Weight	1/4	1/2	1/2	1/2	1/2	1/2
Packer Protector	Part No.	47761	47740	47734	41060	48337	47968
	Weight	44	60	25	145	145	170
Shear Pin (4 Req'd.)	Part No.	47762	47741	47733	43383	27671	43383
	Weight	1/8	1/4	1/4	1/4	1/4	1/8
Shear Pin Plug (4 Req'd.)	Part No.	10641	10641	10641	36478	36478	36478
	Weight	1/8	1/4	1/4	1/4	1/4	1/4
Control Packer	Part No.	11475	11477	11477	41039	41039	41039
	Weight	8	10	10	20	20	20
Grapple	Part No.	11258	11263	11263	41037	41037	41037
	Weight	20	30	30	25	25	25
Bowl	Part No.	45003	47735	47735	41036	41036	47967
	Weight	79	90	125	125	125	185
Guide	Part No.	11259	11264	11264	41040	41040	47969
	Weight	90	90	90	130	130	170
Top Extension Seal	Part No.	30-52	—	568-276	—	27-83	—
	Weight	1/16	—	1/16	—	1/16	—

* Special 2 Packers Required for these Assemblies.

How To Order:

- Specify: (1) Name and number of assembly or part.
(2) Connection size and type.
(3) Type of casing patch.
(4) Casing size to be patched.
(5) Length and o.d. of extension if other than standard.

Corporate Headquarters

10000 Richmond Avenue
Houston, Texas 77042
United States
Phone: 713 346 7500
Fax: 713 346 4493

Alaska
4111 Ingra
Anchorage, Alaska 99503
United States
Phone: 907 563 5253
Fax: 907 561 0071

California
4117 Atlas Court
Bakersfield, California 99308
United States
Phone: 661 395 0165
Fax: 661 328 1827

Louisiana
108 Nova Drive
Broussard, Louisiana 70518
United States
Phone: 337 839 2400
Fax: 337 839 2211

190 Thompson Road
Houma, Louisiana 70363
United States
Phone: 985 851 1111
Fax: 985 851 1117

Mississippi
2930 Industrial Blvd.
Laurel, Mississippi 39440
United States
Phone: 601 649 8671
Fax: 601 649 8673

New Mexico
#14 CR 5860
Farmington, New Mexico 87401
United States
Phone: 505 326 4303
Fax: 505 326 4304

North Dakota
3202 1st Avenue West
Williston, North Dakota 58801
United States
Phone: 701 774 0091
Fax: 701 774 0092

Oklahoma
3800 Thomas Road
Oklahoma City, Oklahoma 73179
United States
Phone: 405 677 2484
Toll Free: 877 760 1711
Fax: 405 677 2457

Texas
1249 Commerce Road
Alice, Texas 78332
United States
Phone: 361 664 8013
Fax: 361 664 0462

8411 Irvington Boulevard*
Houston, Texas 77022
United States
Phone: 713 691 7800
Fax: 713 691 7807

2810 Highway 135 North
Kilgore, Texas 75662
United States
Phone: 903 984 2553
Fax: 903 984 7170

10720 West I-20 East
Odessa, Texas 79765
United States
Phone: 432 563 1173
Fax: 432 563 1182

30444 Southwest Freeway
Rosenberg, Texas 77471
United States
Phone: 281 341 5365
Fax: 281 344 1986

Utah
1553 East Highway 40
Vernal, Utah 84078
United States
Phone: 435 789 0670
Fax: 435 789 6568

West Virginia
Route 2, Murphy Run Road
Clarksburg, West Virginia 26301
United States
Phone: 304 622 4303
Fax: 304 623 2174

Wyoming
1283 N. Derrick Drive
Unit 1, Box 2
Casper, Wyoming 82604
United States
Phone: 307 237 3100
Fax: 307 237 2546

Canada
9120 – 34A Avenue
Edmonton, Alberta T6E 5P4
Canada
Phone: 780 702 5209
Fax: 780 463 2348

3550 93 Street*
Edmonton, Alberta T6E 5N3
Canada
Phone: 780 944 3929
Fax: 780 430 0760

1100 540 5th Avenue SW (Mailing)
1010 540 5th Avenue SW (Office)
Calgary, Alberta T2P 0M2
Canada
Phone: 403 250 8000
Fax: 403 294 5790

England
2 Isbourne Way
Winchcombe
Cheltenham
Glos, GL54 5NS
England
Phone: 44 (0) 1242 603975
Fax: 44(0) 1242 602614

Dubai
Nr. R/A 13, Daimler Chrysler Street
P.O. Box 61490
Jebel Ali Free Zone
Dubai
UAE
Phone: 971 4 8838776
Fax: 971 4 8838795

Indonesia
Cilandak Commercial Estate Unit 105
Jl. Raya Cilandak KKO
P.O. Box 7541
Jakarta, 12560
Indonesia
Phone: 62 21 782 6088
Fax: 62 21 782 6086

Scotland
10 Kirkton Avenue
Pitmedden Road Industrial Estate
Dyce, Aberdeen AB21 0BF
Scotland
Phone: 441 224 334800
Fax: 441 224 723034

Singapore
9 Tuas Avenue 5
Singapore, 639335
Singapore
Phone: 65 68611566
Fax: 65 68610728

Germany
Edesser Straße 1
31234 Edemissen Berkhöpen
Postfach 31232
Germany
Phone: 49 5176 97670
Fax: 49 5176 9767 22

* Denotes Manufacturing and Engineering facilities

Downhole Solutions

Drilling Solutions

Engineering and Project Management Solutions

Lifting and Handling Solutions

Production Solutions

Supply Chain Solutions

Tubular and Corrosion Control Solutions

Well Service and Completion Solutions